Extension Opportunities
Numicon

This resource outlines extension opportunities that are available for teachers using Ministry-funded maths resources from NUMICON. This resource is designed to support teachers to focus on deepening the maths knowledge of confident learners within their year level.

Visit Tāhūrangi for more information about ordering Ministry-funded maths resources.

Ordering Ministry-funded maths resources

Guidance for teaching to the year level

Extending students is not about accelerating confident learners beyond their year level.

Extension is about stretching and growing confident learners by offering more depth at their year level. Deep learning builds flexible, creative, and independent mathematical thinkers – traits that last well beyond the current year level.

When confident maths learners are extended, they develop the ability to transfer knowledge to new and unfamiliar contexts, tackle problems in multiple ways, communicate reasoning clearly and make meaningful mathematical connections.

Numicon Mapping Chart

Use the Numicon Mapping Chart downloadable from Numicon Online NZ to see what the next steps are for future years and how they relate for the week you are teaching.

Teach from the year expectations rather than the year ahead. Go deeper with these concepts by providing many opportunities for the students to explain their thinking and reasoning and justifying the findings. See next page.

Phase 3

Number

	During year 7 Informed by prior learning, teach students to:	During year 8 Informed by prior learning, teach students to:	Teaching considerations
Number structure	identify, read, write, compare, and order whole numbers using powers of 10 (e.g., 10,000 = 10^4) **NPC5** NNS 1.5, 1.6 **NPC5** P&A 1.3 **NPC5** Calc 10.4, 10.5	identify, read, write, compare, and order whole numbers and decimals using powers of 10 (e.g., 0.01 = $\frac{1}{100}$ = 10^{-2}) **NPC6** NNS 1, 2 **NPC6** Calc 5.1	**Represent** and order numbers using place-value (PV) expanders or charts and number lines.
	find the highest common factor (HCF) of two numbers under 100, and find the least common multiple (LCM) of two numbers under 10 **NPC5** P&A 3	use prime factorisation to represent a number and to find the HCF of two numbers **NPC6** P&A 1	**Represent** factors using factor trees, or systematic lists. **Connect** HCFs to simplifying fractions, and LCMs when renaming fractions. **Generalise** conjectures about prime or composite numbers by investigating factors.
	use exponents to represent repeated multiplication, and identify square roots of square numbers up to at least 100 **NPC5** P&A 4.4, 4.5, 4.6, 4.7, 5.7 **NPC6** Inv 1	identify and describe the properties of prime and composite numbers up to at least 100 and cube numbers up to at least 125 **NPC5** P&A 3.4, 3.6, 3.7, 4.7 **NPC6** P&A 1.2, 4.5	**Investigate** and **generalise** divisibility tests for composite and prime numbers, and **connect** the results to square and cube numbers and square roots. **Investigate** and **explain** patterns in repeated multiplication and **represent** them using exponent notation. **Connect** prime and composite numbers with factors, and **represent** a number as a product of its prime factors (prime factorisation).

Focus Activities

The weekly Focus Activities are designed for all children to participate in learning the key mathematical ideas. The opening activities/lessons serve as a review from previous learning and a foundational introduction to the learning throughout the week.

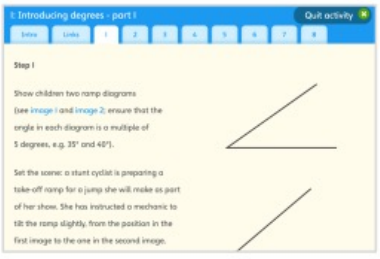
The activities increase in impact and complexity through the week with the final activities written for the more able students. These activities are strong in their generalising and application to other settings to discover the algebraic implications.

Once the activities have been introduced, children will then work in groups. It is at this point that the extension activities are used, and children develop investigations, problem solving and creative maths throughout the week.

The grouping builds a community of learning but also an opportunity to see possibilities when working alongside all learners, especially in discussions.

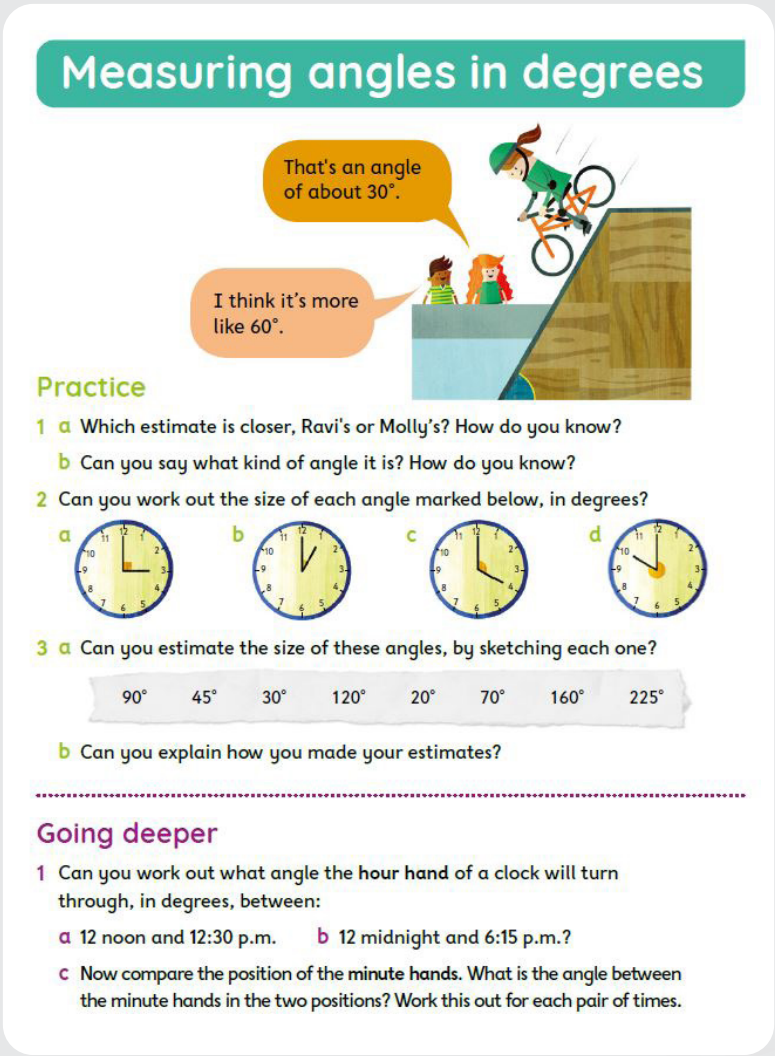
Focus activities

1. Introducing degrees
2. Measuring angles with a protractor
3. Measuring angles and planning a route
4. Drawing angles and plotting a route
5. Finding missing angles at a point and on a straight line



‘Going Deeper’

Use the ‘Going Deeper’ sections from the Student Books for Years 4 to 8 to challenge students. ‘Going deeper’ questions are designed to develop children’s growing conceptual and procedural understanding of an area, challenging their understanding beyond routine exercises. In these sections, children are commonly asked to check, explain and justify their strategies and thinking. Trying to explain something clearly helps promote and is a key indicator of developing conceptual understanding.



Measuring angles in degrees

Practice

1 a Which estimate is closer, Ravi's or Molly's? How do you know?

b Can you say what kind of angle it is? How do you know?

2 Can you work out the size of each angle marked below, in degrees?

a b c d

3 a Can you estimate the size of these angles, by sketching each one?

90° 45° 30° 120° 20° 70° 160° 225°

b Can you explain how you made your estimates?

Going deeper

1 Can you work out what angle the **hour hand** of a clock will turn through, in degrees, between:

a 12 noon and 12:30 p.m. b 12 midnight and 6:15 p.m.?

c Now compare the position of the **minute hands**. What is the angle between the minute hands in the two positions? Work this out for each pair of times.

Whole Class Discussions

Use the Connecting and Reflecting questions each week as Whole Class Discussions. This helps the students to think deeper about their learning, how it might be applied to everyday life, other connections in maths as well as deeper maths problems.

The Implementation Guide suggests questions as an encouragement for them to think deeper and to help them become consciously aware of what they know and begin to monitor their learning. e.g. 'Is there something you would like to do again?'